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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,706	02/20/2004	Chandra Mouli	M4065.0986/P986	4202
24998	7590	03/24/2006	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			VU, HUNG K	
2101 L Street, NW			ART UNIT	
Washington, DC 20037			PAPER NUMBER	
			2811	

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/781,706	Applicant(s) MOULI, CHANDRA	
	Examiner Hung Vu	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) 4,5,12,13,17-19,21,25 and 35-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-11,14-16,20,22-24 and 26-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Embodiment 1, claims 1-3, 6-11, 14-16, 20, 22-24 and 26-34, in the reply filed on 12/29/05 is acknowledged. The traversal is on the ground(s) that examination of the claims of Embodiment 1 will necessarily include a search and examination of subject matter included in the Embodiment 1-4, therefore, no undue burden would be involved in examining the claims of Embodiment 1-4 together. This is not found persuasive because it is well settled that species are required to be restricted if it is shown that these species are distinct. It is clearly established that species are in fact distinct in the Restriction requirement.

The requirement is still deemed proper and is therefore made FINAL.

2. Claim 34 is not belong to the elected embodiment and claims 4, 5, 12, 13, 17-19, 21, 25 and 35-48 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Embodiment, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 12/29/05.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Clevenger et al. (US 2004/0227061).

Clevenger et al. discloses, as shown in Figures 1-13, an image sensor comprising:

- a substrate (100B) formed over a base layer (100A);
- a plurality of pixel cells (104A,104B) formed within the substrate, each pixel cell comprising a photo-conversion device;
- a plurality of trenches (116A,116B), each trench being provided along a perimeter of a respective pixel cell, each trench extending to a surface of the base layer, each trench having sidewalls, and being at least partially filled with a material that prevents at least a portion of electrons from passing through the trench.

Regarding claim 10. Clevenger et al. discloses the sensor comprises a CMOS image sensor.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061) in view of Rhodes (US 2003/0089929).

Art Unit: 2811

Clevenger et al. discloses the claimed invention including the sensor as explained in the rejection above. Clevenger et al. does not disclose the depth of the trench being greater than about 200 Angstroms. However, Rhodes discloses a trench having the depth of at least about 500 angstroms to 10 um. Note Figure and section [0056] of Rhodes. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the trench of Clevenger et al. having the depth of as claimed, such as taught by Rhodes in order to further prevent the electrons from passing to the adjacent devices.

5. Claims 2, 3, 6, 7, 14-16, 20, 22-24 and 26-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061) in view of Rhodes (US 2003/0089929) and further in view of Yoshinori (JP 363009968).

Clevenger et al. and Rhodes disclose the claimed invention including the sensor as explained in the rejection above. Clevenger et al. and Rhodes do not disclose a thermal oxide on the sidewalls of the trench structure, and the first material selected from the group consisting of undoped polysilicon. However, Yoshinori discloses a thermal oxide (26) on the sidewalls of the trench, and the filled material (27) comprising an undoped polysilicon. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the trench of Clevenger et al. and Rhodes having the thermal oxide on the sidewall of the trench and the filled material of undoped polysilicon, such as taught by Yoshinori in order to further prevent the electrons from passing through the isolation structure.

Art Unit: 2811

Regarding claims 16 and 28, the term “high-density plasma oxide and spin on dielectric oxide” is method recitation in a device claimed. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claims 22-23 and 30-32, Clevenger et al., Rhodes and Yoshinori disclose the trench has a depth greater than 2000 Angstroms.

Regarding claims 24 and 32, Clevenger et al., Rhodes and Yoshinori disclose the semiconductor device comprises a CMOS image sensor.

Regarding claim 26, Clevenger et al., Rhodes and Yoshinori disclose a processor.

Regarding claims 11 and 33, Clevenger et al., Rhodes and Yoshinori do not disclose the semiconductor device comprises a CCD image sensor. However, Clevenger et al., Rhodes and Yoshinori disclose a CCD image sensor has some advantages such as smaller size than the CMOS image sensor. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device of Clevenger et al., Rhodes and Yoshinori comprising CCD image sensor in order to reduce the size and to improve the circuit density.

Conclusion


6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Tuesday to Friday 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272 - 1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vu

March 16, 2005


Hung Vu

Primary Examiner